REMARKS

Responsive to the Official Action mailed July 9, 2003, Applicants provide the following remarks. Reconsideration and allowance of the subject application, as amended, are respectfully requested.

35 U.S.C. §102 Rejection

Claims 1, 3-10, 13, 14, 16-23 and 26-32 have been rejected under 35 U.S.C. § 102 as being unpatentable over Lu et al (US Pat. No. 5,539,290). The Examiner points to Lu as disclosing "a safety device for a power window comprising a DC motor 16 for driving an output of an actuator and a controller 10a for controlling the power to the said motor based on a feedback signal." Applicant respectfully traverses this rejection.

Claim 1, as amended, requires "a controller configured to interrupt operation of said motor in response to at least one feedback signal, said feedback signal being representative of variation of at least one motor parameter with respect to torque." Support for such claim amendment to claim 1 can be found throughout the specification, e.g. in original claims 5 and 8 and at page 5, line 16 to page 6, line 13 and FIG. 2 of Applicant's specification. No new matter has been entered.

For example, FIG. 2 illustrates a plot where the motor parameter with respect to torque may be motor speed and/or motor current draw. Plot 51 is a plot of motor speed with torque and a plot 53 is a plot of motor current draw with torque. The change in motor speed with torque and the change in motor current draw with torque between a normal and obstructed load are also

illustrated such that "if the obstruction is robust enough, i.e. dω/dT and/or dI/dT in FIG. 2, exceeds some predetermined value required to trigger a pinch protection condition." Page 5, lines 21-23 of Applicant's specification. As such, "the controller may distinguish between a modest blockage where the pinch protection feature should not be activated, and a more severe blockage that should enable the pinch protection feature by interrupting power to the motor 12 and/or retracting the window by operating the motor in a reverse direction." Page 6, lines 5-9 of Applicant's specification.

Lu, in contrast, is directed to automatic venting system "adapted for use with automobiles which include one or more vents, such as windows, sun roof and/or a convertible top, each of which is operated by a vent motor such as motor 16." Column 3, lines 29-32. When closing such a vent, Lu teaches to make control decisions based on one feedback signal of current draw of the motor with respect to time. For instance, Lu teaches, with reference to FIGs. 5A and 5B having time "t" on the horizontal axis that "when an obstacle impedes the closure of the window, increased current load is sensed at 51 and the vent motor is either immediately shut off or reversed in order to avoid damage to the obstruction." Column 5, lines 7-10.

Lu indicates that there are drawbacks to comparing such motor current draw levels over time with a fixed threshold value. These drawbacks include "where the obstruction force is very small … the system which uses fixed current thresholds is often unable to accommodate the requirement of detecting such abnormal loads." Column 5, lines 17-19. Lu also indicates that "these systems are ineffective in cases where resistances develop due to wear and tear of the vent, such as the change of vent track friction. If the preset thresholds are too low, typically the vent either cannot be automatically closed the entire way …. On the other hand, if the present

threshold is too high, the system will simply not be able to detect the fully open position or the obstruction." Column 5, lines 30-40. Therefore, Lu teaches to a system to "dynamically modify the predetermined thresholds in accordance with condition variations in the operating current of the vent motor." Column 5, lines 60-62.

In contrast to that taught by Lu, claim 1 requires "a controller configured to interrupt operation of said motor in response to at least one feedback signal, said feedback signal being representative of variation of at least one motor parameter with respect to torque." A motor parameter, e.g., motor current draw, may change significantly with respect to time but not trigger an interrupt of the interrupt of the motor.

In summary, Lu does not teach "a controller configured to interrupt operation of said motor in response to at least one feedback signal, said feedback signal being representative of a motor parameter with respect to torque" as required by claim 1. Rather, Lu compares motor current draw over time with dynamically changing current threshold levels.

Claim 6 has been cancelled without prejudice. Claims 2-5 and 8-13 are dependent claims that depend directly or indirectly from claim 1 and are allowable for reasons above adduced relative to claim 1 in addition to their own further limitations.

Claim 14 is directed to a vehicle window lift system that, similarly to claim 1, requires "a controller configured to interrupt operation of said motor in response to at least one feedback signal, said feedback signal being representative of variation of at least one motor parameter with respect to torque, said motor parameter varying with variation in a load on said window." Claim 14 is allowable for similar reasons above adduced relative to claim 1.

Claim 19 has been cancelled without prejudice. Claims 15-18 and 20-26 are dependent claims that depend directly or indirectly from claim 14 and are allowable for reasons above adduced relative to claim 14 in addition to their own further limitations.

Claim 27 is a method claim requiring, among other things, "sensing torque of said motor; and disabling said motor when a variation in said motor parameter with respect to a variation in said torque reaches a predetermined level." As earlier adduced relative to claim 1, Lu does not disclose, teach, or suggest "sensing torque of said motor." Therefore, Lu does not also disclose, teach, or suggest "disabling said motor when a variation in said motor parameter with respect to a variation in said torque reaches a predetermined level" as required by claim 27. Rather, Lu evaluates a change in motor current draw over time and compares motor current draw over time to "dynamically changing thresholds." Column 5, lines 54-55.

Claim 28-30 and 32 are dependent claims that depend directly from claim 27 and are allowable for reasons above adduced relative to claim 27 in addition to their own further limitations.

Claim 31 has been cancelled without prejudice.

35 U.S.C. §103 Rejection

Claims 2, 11, 12, 15, 24 and 25 have been rejected under 35 U.S.C. § 103 as being unpatentable over Lu in view of Takeda et al (US Pat. No. 5,422,551). The Examiner indicates that Lu does not specifically describe the motor connected to a gear train and that the position sensors are hall effect sensors. The Examiner indicates that Takeda supplies these missing

teachings, and "it would have been obvious to one skilled in the art to choose to use Hall Effect sensors, since said sensors would generate an output signal every time the motor moves."

Claim 2 depends from claim 1. Claim 1 is patentable over Lu for the reasons earlier adduced relative to claim 1. Again, Lu does not teach "a controller configured to interrupt operation of said motor in response to at least one feedback signal, said feedback signal being representative of a motor parameter with respect to torque" as required by claim 1. Rather, Lu compares motor current draw over time with dynamically changing current threshold levels. Hence, claim 2 is also patentable over Lu for similar reasons in addition to its own limitations.

Takeda does not provide the missing teachings of Lu. Takeda teaches a "safety device for a power window" having detectors for detecting the "absolute and relative speeds of a power window opening or closing operation to determine whether or not a foreign object is caught in the window." Abstract of Takeda. Takeda teaches the use of absolute and relative speeds with respect to time, not with respect to torque, as required by claim 1. For instance, with reference to FIGs. 9(a) and 9(b) of Takeda, Takeda illustrates absolute speed versus time and relative speed versus time respectively. Takeda is concerned with detecting a "backlash condition" and disabling safety control during such backlash condition for a certain time interval. Column 10, lines 4-10. For instance, with reference to FIG 9(a) and 9(b), "at the time instant t1 when the backlash detector 66 detects backlash, the foreign-object-caught reference value setting unit 68 changes the reference value to the large negative value, and therefore the foreign-object-caught detector 62 outputs no signal, forcibly inhibiting the safety control operation." Column 9, line 67 to column 10, line 4.

Claims 11 and 12 depend indirectly from claim 1, and are allowable for the reasons above adduced as well as for their own limitations. In addition, claim 12 requires a "two-pole permanent magnet rotor, and said at least one position sensor comprises three Hall effect sensors equally spaced along a circumference of said rotor." For instance, see FIG. 3 of Applicant's specification. Takeda does not teach, disclose, or suggest such a two-pole permanent magnet rotor. Takeda discloses an annular magnet 10 (FIG. 3 of Takeda) and a "pair of Hall elements 11a and 11b ... arranged around the magnet 10 in such a manner that they are shifted from each other by 90 degrees in angular position." Column 3, lines 54-56.

Claims 15, 24, and 25 depend directly or indirectly from claim 14. Claim 14 is directed to a vehicle window lift system that, similarly to claim 1, requires "a controller configured to interrupt operation of said motor in response to at least one feedback signal, said feedback signal being representative of a motor parameter with respect to torque, said motor parameter varies with variation in a load on said window." Claim 14 is allowable for similar reasons above adduced and hence dependent claims 15, 24, and 25 are also allowable for similar reasons in addition to their own limitations.

In summary, neither Lu nor Takeda, either explicitly or implicitly, teach or suggest an actuator, system, and method as claimed. Accordingly, Applicant respectfully submit that in light of the foregoing claim amendments and remarks, all of the presently pending claims are now in a condition for allowance. Reexamination and reconsideration are respectfully requested.

Early allowance is earnestly solicited. In the event the Examiner deems personal contact desirable in disposition of this application, the Examiner is respectfully requested to call the undersigned attorney at (603) 668-6560.

Respectfully submitted,

Donald J. Perreault, Attorney For Applicants
Registration No. 40,126
GROSSMAN, TUCKER, PERREAULT
& PFLEGER, PLLC
55 South Commercial Street
Manchester, NH 03101
Ph: 603-668-6560
Fx: 603-668-2970